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JOINT COMMITTEE ON ATOMIC ENERGY

REPORT OF THE COMPTROLLER GENERAL OF THE UNITED STATES

ON

ATOMIC ENERGY COMMISSION CONTRACTS FOR ELECTRIC POWER

PART 1

REVIEW OF EBASCO SERVICES, INC., PERFORMANCE AT JOPPA, ILL., STEAM ELECTRIC STATION OF ELECTRIC ENERGY, INC.

MARCH 31, 1955

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CONTENTS

	Page
Introduction	1
Summary	4
Conclusions	5
Chronology of significant events	5
Base Paducah power contracts	6
Expansion Paducah power contracts	6
Termination of Ebasco's construction services	6
Electric Bond & Share (Ebasco) Middle South Utilities	7
Electric Bond & Share Co	7
Ebasco Services, Inc	8
Middle South Utilities, Inc	8
Selection of power suppliers for Paducah	9
Ebasco's construction cost estimates	12
Termination of Ebasco's construction services	13
Studies of increases in construction cost estimates	14
The Ebasco report	14
The Strasser report	15
The Smith report	16
The Paducah report	17
Conclusions and findings	17
Effects of Ebasco's performance	21
Ebasco's delay in submitting cost information	23
Ebasco's fee and billings for service	24
Current status of Ebasco on AEC projects	26

INTRODUCTION

The Joint Committee on Atomic Energy in carrying out its statutory responsibility to consider long-term utility contracts of the Atomic Energy Commission has been deeply interested in the performance of Ebasco Services, Inc., as construction contractor of the steam electric generating plant of the Electric Energy, Inc., at Joppa, Ill. The committee's interest was accentuated by the proposal made by the Mississippi Valley Generating Co., that Ebasco Services, Inc., build the steam generating plant at West Memphis, Ark.

At the time of the waiver hearings in November 1954 (see Joint Committee Print on Exercise of Statutory Requirements of Sec. 164, Atomic Energy Act of 1954—Utility Contract Between Atomic Energy Commission and Mississippi Valley Generating Co.—of November 4 through 13, 1954), the Joint Committee received assurances from the General Manager of the Atomic Energy Commission that, based on the then known overrun of costs of the Joppa plant, Ebasco Services, Inc., would not be acceptable to the Commission as the construction contractor for the West Memphis plant.

In order to determine specifically how much more the Joppa plant cost the United States Government than originally estimated, the Comptroller General of the United States, after consultation with the Joint Committee, initiated a complete audit of the contract between the Commission and Electric Energy, Inc. As the first phase of this comprehensive undertaking, the Comptroller General made a complete audit of the financial records of Ebasco during the time when it was the construction contractor for the Joppa plant.

On February 3, 1955, Chairman Clinton P. Anderson, of the Joint Committee on Atomic Energy, wrote the Comptroller General of the United States as follows:

FEBRUARY 3, 1955.

Hon. JOSEPH CAMPBELL,
Comptroller General of the United States,
General Accounting Office.

DEAR MR. CAMPBELL: I am advised that the General Accounting Office has recently completed an audit of the utility contracts between the Atomic Energy Commission and the Ohio Valley Electric Corp. and the Electric Energy, Inc.

The Joint Committee would very much appreciate receiving a copy of the report on this audit as soon as it is prepared.

Very sincerely,

CLINTON P. ANDERSON, *Chairman.*

The Comptroller General replied on February 9, 1955, as follows:

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, February 9, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Joint Committee on Atomic Energy.

DEAR MR. CHAIRMAN: By letter dated February 3, 1955, you requested a copy of the report on the General Accounting Office audit of the utility contracts between the Atomic Energy Commission and the Ohio Valley Electric Corp. and the Electric Energy, Inc.

As explained to the staff of your committee, the audit of these utility contracts is currently in progress and will probably continue for several weeks. The report will be issued in several parts, each covering a significant and separate phase of the work. As each part is issued, a copy will be furnished the Joint Committee.

Sincerely yours,

JOSEPH CAMPBELL,
Comptroller General of the United States.

On March 31, 1955, The Comptroller General of the United States forwarded part I of the audit report with the following cover letter:

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D. C., March 31, 1955.

Hon. CLINTON P. ANDERSON,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States.

DEAR MR. CHAIRMAN: Herewith for the use of your committee is a copy of part I of our report on review of Atomic Energy Commission contracts for electric power. This review was made by our Division of Audits, and the report will be issued in three parts.

Sincerely yours,

JOSEPH CAMPBELL,
Comptroller General of the United States.

The complete text of Part I of the Comptroller General's report referred to above comprises the remainder of this Joint Committee print.

REPORT ON REVIEW OF ATOMIC ENERGY COMMISSION CONTRACTS FOR ELECTRIC POWER

PART I

EBASCO SERVICES, INC., PERFORMANCE AT JOPPA, ILL., STEAM-ELECTRIC STATION

As part of our review of the power contract between the Atomic Energy Commission and Electric Energy, Inc., we reviewed the performance of Ebasco Services, Inc., the firm with whom EEI contracted for the design and construction of its electric powerplant at Joppa, Ill. We feel a review of Ebasco's performance is important because (1) the large increase in the estimated construction cost of the Joppa plant resulted in a significant increase in the estimated annual cost of electric power to the Government, and (2) we understand that the Mississippi Valley Generating Co. (known as the Dixon-Yates group), who recently contracted with AEC to furnish a large block of electric power to the Government, is considering using Ebasco for design engineering and construction management of its powerplant at West Memphis, Ark. Our comments are presented under the following captions:

	Page
Summary	4
Conclusions	5
Chronology of significant events	5
Electric Bond and Share, Ebasco, Middle South Utilities	7
Selection of power suppliers for Paducah	9
Ebasco's construction cost estimates	12
Termination of Ebasco's construction services	13
Studies of increases in construction cost estimates	14
Effects of Ebasco's performance	21
Ebasco's delay in submitting cost information	23
Ebasco's fee and billings for service	24
Current status of Ebasco on AEC projects	26

These comments are based on a study of contracts between AEC and EEI, and between EEI and Ebasco; on a review of negotiation files, reports, correspondence, minutes of meetings, cost estimates, and other data made available to us at the Paducah, Oak Ridge, and Washington AEC offices, the Joppa EEI office, and the New York Ebasco office; and on discussions with officials of AEC, EEI, and Ebasco. In addition we have obtained pertinent data from regulatory bodies—the Securities and Exchange Commission and the Federal Power Commission. Comments are included on the history of the Ebasco organization and on the selection of power suppliers for Paducah, because we feel this background is part of the story of Ebasco's performance on the Joppa powerplant.

SUMMARY

Our major comments are summarized below. Where appropriate, a page reference is given for a more complete discussion of a subject.

1. Ebasco is a wholly owned subsidiary of Electric Bond & Share. Middle South Utilities, a public utility holding company whose subsidiaries are serviced by Ebasco, was at one time a subsidiary of Electric Bond & Share, but at the present time is an independent regional holding company system. (See p. 7.)

2. Based on a proposal submitted by EEI in which Ebasco estimated that a four-unit powerplant capable of supplying a firm load of 427,500 kilowatts would cost $70 million, AEC decided to obtain 50 percent of its power requirements for Paducah from EEI. (See p. 11.)

3. One month later AEC increased the EEI firm load to 500,000 kilowatts, and Ebasco increased its cost estimate to $87 million, which estimate was used in the definitive contract. AEC executed what amounted to an open end cost-type contract with EEI on May 4, 1951, for 500,000 kilowatts of power. On October 14, 1952, AEC executed a similar type contract with EEI for 235,000 kilowatts of additional power, which agreement required EEI to add a fifth and sixth unit to its plant. (See pp. 11 and 12.)

4. Ebasco progressively increased its construction cost estimate for the first four units until April 1953 when it reported a cost estimate of $130 million to EEI. EEI immediately took over direct control of construction, and shortly thereafter terminated Ebasco's construction services entirely. (See pp. 13 and 14.)

5. Ebasco, EEI, EEI's consultants, and AEC have all issued reports which discuss Ebasco's increases in its construction cost estimates. (See p. 14.)

6. Based on our review, we are of the opinion that the basic reasons for the increases in Ebasco's estimates are:

(*a*) The original estimate was based on inadequate information.

(*b*) The labor problems encountered were greater than anticipated.

(*c*) The management activities at the site were not adequately performed.

(See p. 17.)

7. The indicated cost of the Joppa administration building is $82 per square foot. We have been informed that a reasonable cost for an administration building is $20 to $24 per square foot. (See pp. 20 and 21.)

8. The total increase in the estimated cost of the Joppa powerplant is $51 million. Because of the nature of the open end cost-type contract, AEC will bear the major portion of this additional cost. The increase in AEC's annual power costs estimated to result directly from the construction cost increase is $2.5 million, or $62.5 million over the 25-year life of the contract. (See p. 21.)

9. It is EEI's opinion that, as a result of Ebasco's defective cost estimates, EEI incurred excess financing costs of approximately $5 million because it was forced to borrow additional funds at a rate of interest which was the highest paid by any utility in a decade. (See p. 22.)

10. There was a 50-generator months' delay in the commercial operation of the first four units of the Joppa plant which delay forced

AEC to incur extra power costs during the construction period in an amount estimated to exceed $8 million. The AEC–EEI contract does not penalize EEI for failure to get the units in commercial operation on the dates stated in the contract. (See p. 22.)

11. There were delays in Ebasco's submission of cost information. Apparently one reason for this was the split in responsibility between the Ebasco Joppa staff and the Ebasco New York staff. (See p. 23.)

12. EEI's independent public accountants have questioned the propriety of almost $500,000 of Ebasco's billings to EEI for services rendered. Such billings to EEI totaled approximately $5 million. (See p. 24.)

13. At the present time the amounts of Ebasco's fee as well as Ebasco's billings for services are in dispute. EEI has proposed a compromise settlement to AEC, providing, so AEC informs us, essentially that Ebasco not be allowed a profit on its construction work but would be allowed a profit on its engineering work. AEC has advised EEI that the minimum negotiated settlement that it can accept, without court action, is one under which Ebasco would receive no profit for its services on the Joppa project. (See p. 26.)

14. The current status of Ebasco on AEC power projects is (1) Ebasco is essentially completed at EEI, (2) Ebasco is the independent engineer at OVEC, and (3) Ebasco is being considered for design engineering and construction management by MVGC (the Dixon-Yates group). (See pp. 26 and 27.)

Conclusions

Based on the findings set forth in this report, it is our opinion that the best interests of the Government would be served if AEC decided to take the following actions with respect to Ebasco's participation in Government work.

1. Develop completely, for the record, all of the aspects of the disagreement between EEI and Ebasco pertaining to the amounts of Ebasco's fee and Ebasco's billings for service, and accomplish a timely settlement in the best interest of the Government (we believe it is important to point out that, based on discussions with AEC officials, we believe that AEC's planned actions are in accordance with this conclusion).

2. Defer consideration on Ebasco's participation in any work on the MVGC plant if MVGC recommends Ebasco prior to a satisfactory settlement of the EEI disagreement with Ebasco.

3. Withhold approval of Ebasco's participation, if recommended by MVGC, even after a satisfactory settlement unless MVGC will give AEC contractual assurance that any increase in the actual cost of construction of the facilities over the contract estimate of $104,115,000 will not be included in the cost of power taken by the Government.

Chronology of Significant Events

Owing to the long period of time covered by these comments, we believe that at the outset a chronology of some of the significant events will be helpful to the reader. It should be pointed out that the events listed below are more adequately described in our com-

ments and that the listing does not include all of the significant events that we discuss in our comments. For convenience we have divided the listing into three parts: (1) Base Paducah power contracts, (2) expansion Paducah power contracts, and (3) termination of Ebasco's construction services.

Base Paducah power contracts:

October 18, 1950: AEC requested proposals from TVA and from American Gas & Electric Co.

November 3, 1950: AEC received proposals from TVA and from A. G. & E.

November 7, 1950: Sargent and Lundy developed estimated costs for constructing and operating an AEC-owned powerplant.

November 8, 1950: AEC decided to award the power supply contract to TVA.

November 13, 1950: Initial meeting held with representatives of private utility companies.

November 21, 1950: Initial proposal received from private utility companies to supply 100 percent of the power requirements.

December 1, 1950: AEC rejected the initial proposal of the private utility companies, but expressed interest in receiving another proposal for 50 percent of the power requirements.

December 6, 1950: Hearings held on AEC and TVA supplemental appropriations.

December 7, 1950: Revised proposal, containing Ebasco's construction cost estimate of $70 million, received from private utilities companies.

December 13, 1950: AEC decided to obtain 50 percent of its power requirements from EEI and 50 percent from TVA.

December 14, 1950: Additional hearings held on AEC and TVA supplemental appropriations.

January 23, 1951: Ebasco prepared a construction cost estimate totaling $87 million.

March 6, 1951: EEI executed a contract with Ebasco for engineering and construction services.

May 4, 1951: AEC executed a contract with EEI for 500,000 kilowatts of power.

July 31, 1951: Ebasco increased its construction cost estimate to $96,915,000.

Expansion Paducah power contracts:

January 1952: AEC requested bids from TVA and from EEI.

February 1952: AEC received proposals from TVA and from EEI.

May 20, 1952: AEC decided to obtain 75 percent of its power requirements from TVA and to request a bid from EEI for the other 25 percent.

June 6, 1952: Ebasco increased its construction cost estimate for the first 4 units to $103,306,000.

June 11, 1952: AEC received EEI's proposal.

September 24, 1952: AEC decided to obtain 25 percent of its power requirements from EEI.

October 14, 1952: AEC executed an interim agreement with EEI for 235,000 kilowatts of power.

Termination of Ebasco's construction services:

December 19, 1952: Ebasco increased its construction cost estimate for the first 4 units to $108,600,000.

February 27, 1953: The EEI board of directors approved Ebasco for engineering and construction of two additional units.

April 23, 1953: Ebasco reported to EEI board of directors that its construction cost estimate for the first 4 units had been increased to $130 million. The board decided (1) that EEI should take over direct control of construction immediately and (2) that consultants should be engaged to investigate and report on construction costs.

May 4, 1953: EEI advised AEC of plans to change the management of the Joppa construction project.

July 1, 1953: EEI and its consultants concurred on a reorganization plan for the Joppa job.

July 3, 1953: EEI advised AEC of plans for reorganization of the Joppa job.

July 23, 1953: AEC executed modification No. 6 to its base contract with EEI. This modification generally covers the provisions of the interim agreement executed October 14, 1952.

July 29, 1953: The EEI board of directors voted (1) to terminate Ebasco's contract for engineering and construction and (2) to enter into new arrangements with Ebasco for completion of engineering work.
August 5, 1953: Announcement made that the Bechtel Corp. had been chosen to complete construction of the Joppa steam plant.
September 4, 1953: EEI's consultants issued "preliminary" report on Joppa construction costs.
March 26, 1954: EEI's independent public accountants issued a report questioning Ebasco's billings to EEI.
May 20, 1954: AEC held a meeting with EEI to discuss the propriety of Ebasco's billings to EEI.
October 5, 1954: EEI transmitted its consultants' "preliminary" report to AEC on request.
February 18, 1955: EEI submitted to AEC the elements of a proposed compromise settlement of its controversy with Ebasco.
March 10, 1955: AEC advised EEI, in effect, that a settlement on the proposed basis was not acceptable.

The following are our detailed comments.

ELECTRIC BOND & SHARE (EBASCO) MIDDLE SOUTH UTILITIES

Ebasco Services, Inc., is a wholly owned subsidiary of the Electric Bond & Share Co. At least three men—Curtis E. Calder, George G. Walker, and T. C. Westcott—are directors in both of these organizations. Middle South Utilities, Inc., was initially a registered holding company subsidiary of the Electric Bond & Share Co.; however, since December 1949, when Electric Bond & Share distributed and sold its holdings in the company, Middle South Utilities has become an independent regional holding company system. All three companies have their principal offices at 2 Rector Street, New York City. A brief history of the three companies is given below.

Electric Bond & Share Co.

The history of Electric Bond & Share goes back to the turn of the century when, in 1905, the General Electric Co. organized the Electric Bond & Share Co. as a wholly owned subsidiary. Twenty years later, General Electric distributed to its stockholders all of the Electric Bond & Share Co.'s stock that it owned, thus divesting itself of control.

The Electric Bond & Share Co.'s system grew and was the largest system to register under the Holding Company Act. At the time of its registration in 1938, it controlled 121 domestic subsidiaries including 5 major subholding companies with combined assets of nearly $3.5 billion. As a result of numerous reorganization plans and proceedings before the Securities and Exchange Commission and the courts, the Electric Bond & Share Co. had reduced its holdings by December 31, 1954, to interests in four companies; Ebasco Services, Inc. (100 percent), Two Rector Street Corp. (100 percent), American and Foreign Power Co. (54.6 percent), and United Gas Corp. (11.2 percent) plus other miscellaneous investments. Electric Bond & Share's fourth quarter report for 1954 places a valuation of $153,725,900 on the above investments. The SEC has approved a Final Comprehensive Plan (the Plan) for Electric Bond & Share's conformance with the requirements of the Holding Company Act. The company's fourth quarter, 1954, report states:

The company intends to seek a definitive exemption from provisions of the Holding Company Act to become effective upon completion of the steps provided for in the plan. If such exemption is granted it is contemplated that the company

will become a registered investment company and as such will be subject to the provisions of the Investment Company Act of 1940.

Electric Bond & Share's annual report (U5S) for 1953 filed with SEC shows that there were approximately 38,000 holders of record of Electric Bond & Share Co.'s outstanding common stock and that the largest holding was 80,000 shares or 1.52 percent of the outstanding 5,250,000 shares.

Ebasco Services, Inc.

According to the 1951 annual report of Electric Bond & Share, the history of the Ebasco organization also goes back to 1905 when the staff of Electric Bond & Share recognized the advantages of a centralized service organization and established such an organization to render a wide range of services to public utility companies in the Electric Bond & Share system. In November 1935, as a result of the Holding Company Act of that year, Ebasco Services, Inc., was organized for the purpose of segregating the service operations performed by Electric Bond & Share for associated companies in the utility field. During the years following its corporate inception in 1935, Ebasco continued to function as a service organization.

After Electric Bond & Share started divesting itself of control in a large number of domestic public utility companies, it decided that Ebasco's services should be made available to public utility companies outside of the Electric Bond & Share system. This decision is noted in the 1951 annual report of Electric Bond & Share Co. on file with the SEC, from which we quote:

> Faced with the necessity, under the terms of the Holding Company Act, of disposing of such companies in the United States, the decision was made in 1942 that the most feasible means of preserving for the Bond & Share stockholders the valuable aggregation of talent represented by Ebasco, was for Ebasco to begin to render services to companies outside of the Bond & Share system.

Ebasco's annual form U–13–60 filed with SEC for the years 1950 through 1953 each state that the principal public utility holding companies whose subsidiaries are serviced by Ebasco are: American & Foreign Power Co., Middle South Utilities, and Texas Utilities Co. These 3 holding companies are, or were at one time, a part of the vast Electric Bond & Share system.

Middle South Utilities, Inc.

Middle South Utilities, Inc., is a relatively new holding company system created in May 1949 as a result of the liquidation of the Electric Power & Light Co., a subsidiary of Electric Bond & Share. SEC ordered Electric Power & Light to exchange its holdings in 4 electric operating subsidiaries (Arkansas Power & Light, Louisiana Power & Light, Mississippi Power & Light, and New Orleans Public Service) and certain other assets for the entire initial issue of Middle South stock. SEC also ordered Electric Power & Light to distribute its holdings in Middle South to its security holders. Under this distribution Electric Bond & Share acquired 16.2 percent of the stock of Middle South but by the end of 1949, Electric Bond & Share had distributed or sold all of its Middle South stock to its stockholders.

Mr. Edgar H. Dixon is president of Middle South. He and all of the other executive officers of Middle South have been officers or associated with the various companies which formally made up the Electric Power & Light interest.

Middle South is one of the 5 sponsoring companies of EEI, owning 10 percent of EEI's outstanding stock, and is the principal sponsor of MVGC, owning 79 percent of MVGC's outstanding stock. Both EEI and MVGC were organized for the same purpose—to build and operate an electric powerplant and to supply the Government a large block of electric power under a 25-year contract with AEC.

Selection of Power Suppliers for Paducah

Our review of the available record indicates that the selection process was initiated October 18, 1950, when AEC, acting on a recommendation of the National Security Resources Board, requested the American Gas & Electric Co. and the TVA to submit proposals covering the supply of approximately 850,000 kilowatts of power for its proposed Paducah plant. The NSRB's recommendation contemplated the possibility that the two organizations would develop a joint proposal.

The proposal received from the American Gas & Electric Co. rejected the possibility of entering into any joint arrangements with TVA or of building a powerplant near Paducah. American Gas & Electric did propose, however, to supply a block of firm power of from 150,000 to 300,000 kilowatts by adding two units to an existing powerplant 255 miles from the site. The TVA proposal provided for delivering the required amount of power at rates which AEC considered to be fair and reasonable and for constructing additional facilities including a new powerplant near Paducah. AEC considered a third possibility for the power supply by employing the engineering firm of Sargent and Lundy to develop the estimated costs of constructing and operating an AEC-owned powerplant at the site.

The Commission, in a meeting on November 8, 1950, considered the various proposals and by a majority vote decided to assign to TVA the power-supply responsibility in accordance with its proposal and to support TVA's request for funds before the Bureau of the Budget. The dissenting voter, however, Commissioner Thomas E. Murray, contacted several private utility companies regarding the submission of an independent proposal.

The initial meeting between AEC and representatives of private utility companies was held November 13, 1950, and the companies invited were Middle South Utilities, Union Electric Company of Missouri, American Gas & Electric, Public Service of Indiana, Illinois Power Co., and Kentucky Utilities. Mr. Tony G. Seal, vice president of Ebasco Services, Inc., also attended the meeting at the request of Mr. Edgar H. Dixon, president of Middle South Utilities. As a result of this meeting, a week later Mr. Dixon submitted, on behalf of the private utility companies, a letter outlining a basis for developing a power supply of 855,000 kilowatts by forming a new company, the stock of which would be owned by 5 private utility companies, and by building a million-kilowatt powerplant near Paducah.

Because of the pressing need to submit budget estimates, the Commission on November 21, 1950, reconsidered its earlier decision and reaffirmed its intent to award the power contract to TVA.

On November 27, 1950, AEC held separate meetings with TVA and with the private utility companies to review their proposals.

The AEC minutes of the meeting with the private utilities contain the following excerpts:

> Selection of the design and construction contractors has not been made. Dixon indicated that Middle South would back Ebasco for the job. The other companies did not indicate concurrence or nonconcurrence.
>
> The estimated time schedule as prepared by Ebasco Services was presented as the official schedule prepared by the group. The schedule satisfies the need but appears to be extremely difficult to accomplish.

After the meeting AEC prepared an evaluation of the proposals of the two groups. One point that bothered AEC was the private utilities' construction cost estimate of $125 million, since the TVA estimate was $139 million and the Sargent & Lundy estimate was $153 million. In preparing the evaluation, AEC assumed a construction cost estimate of $139 million for the private companies (this split the difference between the private utilities estimate and the Sargent & Lundy estimate and equaled the TVA estimate). The evaluation indicated that the TVA proposal would result in an annual bill to AEC of approximately $2 million less than would result from the private utilities' proposal.

On the next day AEC again met separately with TVA and the private utilities to review the evaluation. Minutes of the meetings indicate that TVA generally agreed with the evaluation. At the meeting with the private utilities, however, Mr. Seal objected to the end that the Ebasco estimate of $125 million for constructing the plant was adequate. The minutes indicate that all the other representatives of the private utilities, except Mr. Dixon, were impressed by the Sargent & Lundy estimate and felt that the compromise assumption to use $139 million as a basis for the evaluation was fair.

On the following day, November 29, 1950, AEC received a telegram from Mr. Dixon stating that his group did not feel that AEC's evaluation was fair to them and that he was submitting his own summary. Mr. Dixon's primary complaint involved AEC's increasing the construction cost estimate. The following is quoted from the telegram:

> First, we definitely do not agree with the staff's restatement of our $125 million proposal at the TVA figure of $139 million. The cost of a powerplant depends not alone upon capacity but also in a large measure upon design, structure, and similar items. Our estimate of $125 million was made by Ebasco whose experience in this field cannot be surpassed. We see no reason to recede from this estimate.

The Commission, in a meeting on December 1, 1950, again reaffirmed its decision to award the power supply contract to TVA, but expressed interest in receiving a proposal from the group of private utility companies for a supply of 50 percent of the power requirements.

On December 4, 1950, AEC wrote Mr. Dixon and requested a new proposal from the private power companies for supplying one-half of the necessary power. The next day representatives of AEC met with the private utility representatives in the New York offices of Middle South Utilities and Ebasco Services to facilitate the preparation of a revised proposal. At this meeting AEC was informed that a new company called Electric Energy, Inc., was being incorporated and that, while the construction cost estimate was not complete, preliminary figures indicated a total cost of $65,300,000 for the plant.

AEC testified before a subcommittee of the House Appropriations Committee on December 6, 1950, in support of its request for supplemental appropriations; the largest item in the request being the Paducah project. AEC's printed justification contained the following statement:

> In addition to the amounts provided in this estimate, the proposed supplemental estimate for the Tennessee Valley Authority includes amounts for the construction of additional power facilities, which are essential to the Commission's expanded program.

The private utilities group submitted its revised proposal on December 7, 1950. Although the negotiation files we reviewed did not indicate that an evaluation study, as such, was prepared, the files do contain a narrative writeup which indicates that the revised proposal eliminated the major part of the cost differential that had previously favored the TVA proposal and that "consequently, one-half of the power could therefore be secured from the private utilities for essentially the same cost as from TVA."

The revised proposal of the private utilities was reviewed by the Commission on December 13, 1950, at which time the Commission agreed that the proposal was attractive and requested that negotiations of a definitive contract with the private utilities for the supply of 50 percent of the power be started.

Additional hearings were held the next day by a subcommittee of the House Appropriations Committee. At these hearings the following information was presented: (1) AEC had decided to obtain 50 percent of its power requirements from EEI and 50 percent from TVA, (2) the cost estimates and schedules on which the EEI proposal was based were prepared by Ebasco, (3) the cost of power from EEI was estimated to be 3.57 mills per kilowatt-hour, (4) the EEI plant was estimated to cost $70 million, and (5) the EEI proposal was "just about the same" as the TVA proposal.

During the following 4 months there were numerous meetings and much correspondence between AEC, EEI, and Ebasco which culminated in AEC executing a definitive contract with EEI on May 4, 1951, for 500,000 kilowatts of power. This contract provided for supplying power essentially on a cost basis; however, it did not provide any limit on the cost of power to AEC nor did it give AEC any effective method of controlling the construction cost of the powerplant, which cost is a major element in the cost of power to AEC.

Approximately 6 months later (November 1951) AEC started negotiations for additional power needed at Paducah. In January 1952 EEI and TVA were requested to furnish proposals covering the supply of 940,000 kilowatts of power or any part thereof. Both groups submitted proposals in February, with EEI submitting subsequent proposals in March and April. AEC's economic evaluation of the various proposals from the two groups showed that the TVA proposals were more favorable.

The Commission, on May 20, 1952, took the following actions: (1) approved the assignment to TVA of the responsibility for furnishing 75 percent of the additional power required, (2) rejected the EEI proposals, and (3) invited a revised proposal from EEI for furnishing the remaining 25 percent of the additional power required.

EEI submitted a revised proposal on June 11, 1952, and after a 3-month period of negotiations, the Commission approved EEI for sup-

plying 25 percent of the additional power required. AEC and EEI executed an interim agreement for 235,000 kilowatts of power on October 14, 1952.

Ebasco's Construction Cost Estimates

As noted above, during the negotiations of the EEI base contract Ebasco gave AEC preliminary figures which indicated a construction cost estimate of $65,300,000, and in the proposal of December 7, 1950, the Ebasco construction cost estimate was $70 million. One month later the cost estimate was increased to $87 million which is the estimate used in the definitive contract. While AEC requested an increase in the powerload and approved an increase in the size of the generating units after receipt of the proposal, the major part of the increase appears to have resulted from a reevaluation of the original estimate.

Ebasco progressively increased its construction cost estimate for the first 4 units until it reached $128,500,000 at May 12, 1953. Shortly thereafter EEI terminated Ebasco's construction services. The $128,500,000 estimate was a 47.7-percent increase over the $87 million contract estimate and an 83.6-percent increase over the $70 million proposal estimate.

The expansion program required EEI to add two units to its plant. Ebasco's initial construction cost estimate for units 5 and 6, made in July 1952, was $52 million. This estimate was increased in February 1953 to $59,315,000, or a 14.1-percent increase over the original estimate.

A chronological summary of Ebasco's various construction cost estimates, showing the date of preparation and the percentage of work completed as of that date, follows:

	Estimate	Difference over original	Difference over previous
Units 1 to 4:			
January 1951 (contract estimate)	$87,000,000		
July 1951 (10 percent completion)	96,915,000	$9,915,000	$9,915,000
December 1951 (20 percent completion)	98,950,000	11,950,000	2,035,000
June 1952 (30 percent completion)	103,306,000	16,306,000	4,356,000
December 1952 (55 percent completion)	108,600,000	21,600,000	5,294,000
May 1953 (70 percent completion)	128,500,000	41,500,000	19,900,000
Units 5 to 6:			
July 1952 (contract estimate)	52,000,000		
February 1953 (work not started)	59,315,000	7,315,000	7,315,000

For the purpose of completing the record, we are including both the original construction cost estimates made by the Bechtel Corp., the firm that assumed the construction activity, and the most current Bechtel cost estimates as of the date of our fieldwork, January 1955.

Units 1 to 4	
January 1954 (75 percent completion)	$130,204,000
November 1954 (98 percent completion)	127,970,000
Units 5 to 6	
January 1954 (6 percent completion)	$67,000,000
November 1954 (30 percent completion)	64,500,000

TERMINATION OF EBASCO'S CONSTRUCTION SERVICES

The progressively increasing construction cost estimates soon became a matter of concern to the board of directors of EEI. The minutes of the February 6, 1952, meeting of the board of directors contain the following statement:

> He (Mr. McAfee, the president of EEI) stated that both the extent of expenditures and the rate of progress have become matters of serious concern to members of the board and that in recent weeks he and other members of the board have devoted substantial time to the study of these problems and their possible solution.

As noted before, Ebasco increased its construction cost estimate for the first 4 units to $108,600,000 in December 1952. Among other things, this created a financial problem since EEI's financial plan filed with SEC only provided for funds of $103,500,000. This latter amount represented $3.5 million of equity capital invested by the sponsoring companies, plus $100 million borrowed from 2 insurance companies—$50 million from the Prudential Insurance Co. of America and $50 million from the Metropolitan Life Insurance Co. During this period arrangements were being made by EEI to finance the expansion program, the cost of which was estimated to be $52 million for units 5 and 6 plus $1,400,000 for working capital. In order to provide for the expansion and to insure completion of the facilities in the event of rising costs, EEI filed a financial plan with SEC in January 1953, in the amount of $69,700,000. This amount represented $2.7 million to be invested by the sponsoring companies, $2 million to be borrowed from the Guaranty Trust Company of New York, and $65 million to be borrowed from Prudential and Metropolitan.

We were advised informally by officials of EEI that at the time the $108,600,000 estimate was submitted, EEI felt the $108,600,000 was a relatively firm figure. The basis of this belief was (1) the estimate, in addition to being an increase of approximately $20 million over what was originally considered to be a realistic estimate, was the first estimate prepared since the design was 100 percent complete, (2) all purchases, except minor items, had been made, and (3) the construction itself was then over 50 percent complete.

In the following month (February 27, 1953), Ebasco reported to the EEI board of directors that it had accepted certain recommendations of the board with reference to changes in Ebasco's top management at Joppa. In view of the changes made, the board approved Ebasco for the construction of units 5 and 6.

Two months later (April 23, 1953) Ebasco reported orally to the EEI board of directors that it had again increased its construction cost estimate for the first 4 units, this time by over $20 million from the $108.6 million to $130 million. This increase resulted in the board recognizing that drastic action was necessary. After discussing the financial and other serious problems created by the new estimate, the Board decided that (1) EEI should take over direct control of the construction work immediately, (2) EEI should engage some eminently qualified consultants in the field of powerplant construction to investigate and report generally on the construction and costs of the Joppa plant, and (3) EEI should employ a firm of independent public accountants to audit Ebasco's billings to EEI. Officials of EEI advised us informally that, although the Ebasco construction services were not physically terminated until July 1953, the decision

to terminate was actually made when Ebasco submitted its $130 million estimate.[1]

Mr. McAfee advised AEC, by a telephone call on May 4, 1953, that EEI planned to change the management of the Joppa construction project and to engage consultants to review the project.

EEI engaged Mr. Roland J. Strasser, retired member of Sargent & Lundy, and Mr. L. C. Rogers of the Bates & Rogers Construction Corp. as consultants. On July 1, EEI and its consultants concurred on a reorganization plan. On July 3, Mr. McAfee advised AEC by telephone of the plan, which was to discharge the entire working force and Ebasco on July 10, and to bring in the Bechtel Corp. as the new construction contractor. AEC requested a slight delay in the schedule in order to insure the dependable operation of the second unit at Joppa. EEI agreed to the delay.

On July 29, 1953, the EEI board of directors voted to terminate the Ebasco contract for engineering and construction services and to enter into new arrangements with Ebasco for completion of the engineering work. The newspapers announced on July 31, that the Ebasco contract had been terminated and, on August 5, that the Bechtel Corp. had been selected to complete construction of the Joppa plant.

The EEI consultants issued a "preliminary" report, dated September 4, 1953, which apparently was the only written report they issued. We noted that this report was transmitted to AEC, at AEC's request, on October 5, 1954.

Studies of Increases in Construction Cost Estimates

Ebasco, EEI, EEI's consultants, and AEC have all made studies of the increases in Ebasco's construction cost estimate for the first four units at Joppa. These studies are identified as follows:

1. Ebasco (the Ebasco report, February 1953): Ebasco submitted a formal report comparing the $87 million estimate with the $108,600,000 estimate and explaining the increases. Ebasco has never formally submitted an explanation of the $19,900,000 increase which resulted in the estimate of $128,500,000, although AEC has reported that it has repeatedly requested this information. On our visit to Joppa (January 1955) we were given a written explanation of the $19,900,000 increase which Mr. T. White, vice president of EEI, advised us was based on a telephone conversation with Ebasco, New York.
2. EEI's consultants (the Strasser report, Sept. 4, 1953).
3. EEI (the Smith report, not dated).
4. AEC (the Paducah report, Jan. 20, 1955).

There follows a relatively brief summary of the major points made in each of these studies and a fifth section which contains our findings and conclusions based on a review of these reports and on independent studies.

The Ebasco report

The primary reasons that Ebasco cites for the increases are the unfavorable area labor conditions and the bad performance by labor. In

[1] Although Ebasco reported an estimate of $130 million to the EEI board of directors on April 23, 1953, its detailed estimate prepared May 12, 1953, was only $128.5 million.

addition, Ebasco maintains that the labor situation was the basic cause of practically all of the other factors which contributed to the increase in the estimate of final costs.

Ebasco's explanations can be summarized as follows:

1. Unfavorable area labor conditions required employment of a large percentage of inexperienced workmen and resulted in frequent and extensive jurisdictional disputes and work stoppages.
2. Labor productivity was poor.
3. Pressure to complete the work, which was behind schedule because of the labor situation, resulted in an increase in the labor forces over normal and economical requirements.
4. The longer construction period resulted in higher overhead costs, particularly in the interest charges.
5. There were increases in the cost of both materials and labor.

The Strasser report

The stated purpose of this report was to analyze and report on the $41,500,000 difference between the original Ebasco estimate of $87 million and the last Ebasco estimate of $128,500,000.

The consultants felt that the original Ebasco estimate was far too low for an accounting of the wide spread between it and the $128,500,000 estimate. They accepted the November 1950 estimate made by Sargent and Lundy for AEC, after making certain adjustments to assure comparability, as a more realistic estimate.

The report's analysis of the increase can be summarized as follows:

1. Ebasco's original estimate considered to be too low by	$22,683,000
2. Escalations for equipment purchased and for increases in labor rates estimated to be	7,350,000
3. Excessive construction costs resulting from the poor labor situation and from improper planning or supervision estimated to be	11,467,000
Total	41,500,000

The $11,467,000 is accounted for in the report as the total of (1) $4,042,923 for increased financing costs due in part to the delay in the construction schedule, (2) $3,750,000 for the portion of premium (unworked) time that was considered excessive for a project of this size, and (3) $3,674,077 for unusually high construction costs, of which 11 examples are cited.

Since this is the only report in which poor management is noted to be a contributing factor in the increase in the construction cost, we are listing some of the examples cited, even though the report does not attempt to assign a dollar value to each example.

1. The large number of construction buildings (reported to be over 100) and the character of construction used in these buildings was unnecessary and too expensive for their purpose. The probable cost of these construction buildings was reported to be $5,600,000, which was considered to be an excessively high cost.
2. The locations of many construction buildings were not well planned as they had to be relocated as the job progressed, which made for extra expense.
3. Substantial savings could have been made in field supervision which cost in excess of $2 million.

4. There were many changes in the relocation of roads, parking facilities, and railroad trackage that were attributed to lack of proper planning.

5. Due to improper protection in the storage yard, extra expense was incurred in the cleaning and rehandling of some material and equipment.

6. The cost of form work was excessively high, probably due largely to improper planning or supervision for reuse of form material.

7. Due to an oversight, the administration building could not be located where originally planned, and the final location required an expensive pile foundation.

8. The cost of construction equipment plus the cost of maintaining such equipment was over $4 million, which was considered excessive.

9. There was believed to be much inefficiency in the following departments which were classified as "incidental labor expense":

Guards, watchmen, janitors, etc	$902, 000
Drinking water, ice, and related expense	442, 000

The Smith report

This report was prepared by Mr. E. E. Smith, assistant treasurer and assistant secretary of EEI, and compares Ebasco's original estimate of $87 million with Bechtel's initial estimate of $130,204,000.

Smith's analysis is related to the following schedule:

	Ebasco, Jan. 23, 1951	Bechtel, Jan. 11, 1954	Increase
Land		$111, 201	$111, 201
Labor	$19, 927, 242	47, 020, 333	27, 093, 091
Material	56, 230, 758	66, 057, 097	9, 826, 339
Indirect costs	2, 842, 000	7, 854, 684	5, 012, 684
Overhead	6, 500, 000	12, 327, 619	5, 827, 619
Omissions and contingencies	1, 500, 000	1, 473, 962	−26, 038
Transfer of common facilities and other costs to units 5 and 6		−4, 640, 896	−4, 640, 896
Total	87, 000, 000	130, 204, 000	43, 204, 000

The increase in labor of $27,093,091 was attributed to factors which were difficult to evaluate at the time of the original estimate and which accounted for substantial increases in labor costs. These factors are briefly summarized.

1. Productivity was very poor due to the vast construction programs being carried on in the area which made experienced labor difficult to obtain.

2. There was excessive rainfall during 1951.

3. There was a large amount of second-shift work which was not considered in the original estimate.

4. Due to falling behind in the work, efficient scheduling was sacrificed for speed.

5. Labor disputes resulted in a substantial number of work stoppages.

6. There was an increase in wage rates between the two dates.

The increase in material of $9,826,339 was attributed to changes in scope, factors not considered in the original estimate, and escalation. No comparison could be made of indirect costs and the increase of

$5,012,684 was not explained. The increase in overhead costs of $5,827,619 was accounted for primarily by the increased interest cost of $4,700,000.

The Paducah report

An explanation of the increase in the Ebasco estimates from $87,000,000 to $128,500,000 is given as part of a report on EEI Power Contract Administration issued on January 20, 1955.

The explanation in this report generally recites the points in the other reports with the emphasis on the labor situation and on changes in scope and underestimating.

The magnitude of Ebasco's labor-relation problem is indicated by a summary of EEI work-stoppage reports which shows 48 separate strikes during the period May 1951 through July 1953, point of termination of Ebasco. These strikes caused 96½ days of lost time by all crafts, plus considerable additional lost time by individual crafts. The report also notes that in November 1954 two union labor leaders, Evan Dale and James Bateman, were brought to trial on charges of extortion and attempted extortion of approximately $1,030,000 from the Joppa Steam Electric Station management personnel. Both men were found guilty—Evan Dale was sentenced to 15 years, plus a $20,000 fine, and James Bateman was placed on a 5-year probation, during which time he is not permitted to become an official of a labor organization, and fined $2,000.

Conclusions and findings

Based on a review of the above reports and on our own independent studies, we are of the opinion that the basic reasons for the increases in Ebasco's construction cost estimates are as follows:

1. The original estimate was based on inadequate information.
2. The labor problems encountered were greater than anticipated.
3. The management activities at the site were not adequately performed.

Each of these reasons are discussed below.

Probably the best indication of the limited extent of the information on which the original estimate was based is the following excerpt taken from Ebasco's original estimate:

> At the time this estimate was prepared only preliminary general arrangement and some study drawings were available. No final purchase orders had been placed on any equipment or materials but major items have been estimated on the basis of verbal commitments for a smaller installation or on prices prevailing at date of the preparation of the estimate, including anticipated escalation. Labor is estimated on two 10-hour shifts 5 days per week at existing labor rates. Estimate is based on construction schedule calling for trial operation of the first unit September 1, 1952, and the last unit March 1, 1953.

We believe that the reference in the above except to "a smaller installation" is significant. Based on information obtained from FPC, Ebasco designed and constructed 27 new steam electric plants in the postwar period, 1946–53. Of the 62 individual units constructed, 1 unit had a nameplate rating of 125,000 kilowatts, 1 unit had a nameplate rating of 100,000 kilowatts, and the other 60 units had nameplate ratings of less than 100,000 kilowatts. No individual plant had a capacity as high as 400,000 kilowatts. The original estimate for the Joppa plant was based on units with a 125,000-kilowatt nameplate

rating and on a plant with a 625,000-kilowatt capacity. The above statistics on Ebasco's postwar activity through 1953 includes only new plants and does not include additions to existing plants, which information we understand is not readily available. Furthermore, we have learned from FPC and AEC that at the time Ebasco prepared the original estimate there were few if any companies which had had much experience in designing powerplants with such large units.

Accordingly, it seems reasonable to conclude that an estimate of the cost of constructing a plant, with units of such unusual size, based on only preliminary plans and some study drawings and without any detail design specifications or other firm data, could at best have been only a rough guess. As it turned out, the estimate was too low—very much too low.

Some of the studies explained that part of the material cost increase was due to escalation and to changes in scope. We noted that the original estimate provided for "anticipated escalation"; therefore, escalation should not be a legitimate explanation for part of the increase unless one states that the estimate did not adequately provide for escalation. Also, we do not agree that all of the numerous items listed as "change in scope" are actually changes in scope. For the most part they appear to be examples of inadequate estimates which did not become apparent until detail designs were available. The largest "change in scope," moneywise, was a $1,730,000 addition for an earthquake design factor. We determined from TVA Shawnee personnel that the area was an earthquake area and that such a factor should be provided for in an estimate. We do not believe, therefore, that such an increase resulted from a change of scope but, rather, resulted from inept estimating.

The second basic reason, in our opinion, is that the labor problems encountered were greater than anticipated. The record supports the fact that the Joppa job had substantial labor difficulty, both from work stoppages and from low productivity. The increase in labor cost is further aggravated by the fact that labor cost, in the original estimate, was based on a 2-shift, 5-day workweek at existing labor rates, with apparently no provision for premium time or wage increases. According to the Strasser report, the total amount paid for premium time was $5,750,000, of which $3,750,000 was considered excessive for a plant of Joppa's size, and, according to the Smith report, the wage rates for most crafts increased 20 to 30 percent during the 2-year period.

While we do not intend in any way to minimize the effect of labor difficulty in explaining the increase in the cost estimates, we do not believe that labor difficulty alone is responsible for all of the increase. While the actual effect, in our opinion, is impossible to measure, we believe that some of the studies give too much emphasis to the effect of the labor difficulties.

First, it should be realized that work stoppages were not confined to the Illinois side of the Ohio River. The other two projects that were being built in the same area—the AEC Paducah atomic plant and the TVA Shawnee powerplant—also suffered from work stoppages. As noted previously there were 48 strikes at Joppa resulting in 96½ calendar days of lost time for all crafts, plus approximately 60 calendar days of lost time for individual crafts. Based on information supplied to us by TVA, during the same period there were 33

strikes at Shawnee resulting in 11 calendar days of lost time for all crafts, plus approximately 120 calendar days of lost time for individual crafts. While it is obvious that the magnitude of the work stoppages at Joppa was greater than at Shawnee, it is apparent that Shawnee also suffered a substantial number of work stoppages. AEC has reported, however, that TVA has informally advised it that the first 4 units at Shawnee were completed within TVA's original cost estimate of $88,500,000.

Second, a specific example where we believe that too much emphasis was given to labor difficulty was in Ebasco's informal explanation of the $19.9 million increase from its $108.6 million estimate to its $128.5 estimate. Ebasco attributed a $9 million increase in the installation cost of the production plant (an increase from $27 million to $36 million) to "the low unprecedented labor productivity" and "the long work stoppage in January" (1953). While the work stoppage referred to was major and involved all crafts for a 15½-day period, we find it difficult to conceive that such a work stoppage would account for a $9 million increase, particularly since it resulted in a 33⅓ percent increase in an estimate which was made when construction was more than half complete. We give little weight to the "unprecedented low productivity" factor, since at the date that the $108.6 estimate was prepared, December 1952, there had been 33 work stoppages plus considerable evidence of low productivity. It therefore appears that the estimators should have been alerted to and allowed for "low productivity."

The third basic reason, in our opinion, is that the management activities at the site were not adequately performed. Numerous examples of poor planning and supervision were cited in the Strasser report and have been listed previously. An AEC report of a meeting between AEC and EEI officials notes that EEI maintains it called Ebasco's attention to many mistakes made in the design and construction of the project and that in its opinion EEI could establish that much of the excess cost of construction was due to poor supervision by Ebasco.

In addition, we believe that the Ebasco management at the site cannot avoid some of the responsibility for the abnormal amount of labor difficulty experienced. Two examples, in addition to the points previously made, are given to illustrate that productivity was unusually low. The EEI consultants indicated in their report that while a lower than average productivity was to be expected in this area, they had observed productivity on their visits and it seemed "extraordinarily poor." Also, information obtained from AEC files indicates that at the time EEI decided to terminate Ebasco's construction services, "only 2 or 3 men out of every 10 on the Joppa job were working."

The final point to substantiate our opinion that Ebasco's management activity at the site was not adequately performed is the history of the job after the Bechtel Corp. assumed responsibility for construction. Within 2 weeks after Bechtel started construction there was a work stoppage that lasted 20 days; however, since the settlement date of that initial work stoppage, October 16, 1953, the job has proceeded without any labor difficulty. We believe the situation was well summarized by Mr. Richard Cook, now Deputy General Manager

of AEC, when, in testifying on the Joppa job before a subcommittee of the House Appropriations Committee in March 1954, he stated:

> In retrospect, I believe that the experience that has been enjoyed by Bechtel Corp. since they have assumed responsibility for the construction has indicated that they have the management and experience and know-how to avoid the difficulties that were previously encountered which caused labor-management disputes and strikes.

During our review of the increases in the Ebasco cost estimates we made as many independent determinations as we thought were feasible. One of our most startling findings concerns the exorbitant cost of the administration building and the equipment repair building at Joppa. While we appreciate that the cost of these buildings is not significant when compared to the total cost of the Joppa steam plant, we believe that a discussion involving a cost analysis of an everyday building will be better understood and, therefore, more informative than a discussion involving the cost of something as technical as a steam electric plant. In addition, Ebasco's experience with these buildings appears to be typical of its experience with the powerplant.

Ebasco estimated that the direct costs of the administration building at Joppa would be $159,000, or $33 per square foot for 4,800 square feet.

The direct costs of the administration building as of December 31, 1954 (at which date the building was essentially complete), was $299,795 or $62 per square foot. This is almost a 90 percent overrun. In addition, the most current cost estimate of the Joppa plant shows that indirect costs plus overhead are 30.8 percent of direct costs. By adding $92,337 (or 30.8 percent of $299,795) to the direct costs of $299,795 an indicated cost of $392,132 or $82 per square foot is obtained for the Joppa administration building.

AEC officials at Oak Ridge advised us that $20 to $24 per square foot would be a reasonable cost for an administration building. Figures given us by AEC show that the cost of the administration building at Portsmouth, an admittedly austere structure, was $15.62 per square foot and that the preliminary estimate for the Weldon Springs administration building is $18 per square foot.

We inspected the building and in our opinion it is not an elaborate structure. Ebasco's estimate of July 31, 1951, describes the building as follows:

> Single-story building 116 by 41 feet by 13 feet high, concrete block and brick-veneer construction with precast concrete sills and coping on structural steel frame. Foundation of reinforced concrete footings and grade beams with concrete floor slabs at grade. Roof concrete with 2-inch foam glass insulation and builtup roofing. Interior partititions of 4-inch cinder block and removable steel panels. Interior masonry walls are plastered and ceilings are suspended acoustical tile. Windows steel sash, door hollow metal and the walls also contain some glass block panels. Offices are air conditioned and heating and ventilating, plumbing, lighting are included.

When we brought the cost of this building to the attention of the manager of the AEC Oak Ridge operations office, he immediately ordered that an audit be made of costs incurred through December 31, 1954. The Oak Ridge auditors issued a report, dated February 7, 1955, and the only errors they noted were minor and involved approximately $3,000. The auditors' report states that they were unable to determine the specific reasons for the increase and turned the pertinent plans and available cost data over to an AEC engineer. The engineer could conclude only that labor and installation costs were excessive.

Of the $299,795 direct costs incurred through December 31, 1954, $291,381 were incurred by Ebasco as of July 27, 1953, its termination date. A schedule showing Ebasco's estimate and costs incurred, by broad construction features, follows:

	Ebasco's estimate July 31, 1951	Ebasco's costs July 27, 1953	Costs over or under (−) estimate
Substructure: Excavation, pilings, and concrete	$18,700	$77,368	$58,668
Superstructure:			
Structural and other steel	24,500	27,201	2,701
Walls, floors, and ceilings	34,400	52,283	17,883
Roof	18,200	18,926	726
Doors and windows	8,800	17,873	9,073
Building equipment:			
Heating and ventilation	19,500	33,951	14,451
Plumbing, drainage, etc	15,500	14,774	−726
Lighting and building wiring	10,000	44,093	34,093
Cleaning, finishing, and painting	9,400	4,912	−4,488
Total	159,000	291,381	132,381

Of the $291,381 of direct costs incurred, $84,218 represents material cost and $207,163 represents installation cost.

A detail study was made of the cost of the 29 hollow metal doors installed in the building. The material cost of the doors was $3,314 or $114 per door and the installation cost was $8,034 or $277 per door. Therefore, the total installed cost was almost $400 per door.

With respect to the equipment repair building, Ebasco estimated that the direct costs, exclusive of any equipment, would be $119,800 or $42 per square foot for 2,835 square feet.

The direct costs of the building at December 31, 1954, was $200,623 or $71 per square foot. After the adjustment is made to add indirect costs and overhead, the indicated cost of the equipment repair building, exclusive of any equipment, is $262,415 or $93 per square foot.

Based on our analysis of over 50 percent of the building costs, labor costs represent approximately 80 percent of the total cost of the building.

Effects of Ebasco's Performance

The increase in the construction cost of the plant and the other aspects of Ebasco's performance have two principal effects on AEC's power supply. These effects are (1) there will be a significant increase in the cost of the power to AEC, and (2) there was a substantial delay in the commercial operation of the first four units at Joppa which resulted in AEC incurring additional power costs. These two points are discussed below.

By letter dated May 19, 1954, the Chairman of the Atomic Energy Commission advised Representative Sidney R. Yates that the increase in the estimated cost of the Joppa powerplant was $58 million, and that the increase in AEC's annual power costs estimated to result directly from the construction-cost increase was $2,800,000. Over the 25-year life of the contract this estimated increase in power costs to AEC would be $70 million. Since the date of the Chairman's letter the estimated cost of the Joppa power plant has decreased approximately $7 million and AEC has advised us that its current estimate of the increase in annual power costs resulting directly from

the construction-cost increase is $2,500,000, or $62,500,000 over the 25-year life of the contract.

One element of extra cost that was not passed on to the Government was the rise in interest cost resulting from the step-by-step increase in the estimated maximum cost of the project over an inordinately long period of time. According to an AEC report of a meeting held with EEI officials, EEI advised AEC that it had repeatedly requested Ebasco to furnish it with an estimate of the maximum cost of the project but each time it was given a figure that had to be increased very shortly thereafter. EEI's primary concern was to obtain an estimate high enough to include every possible contingency so that the necessary financing could be arranged. It is EEI's opinion that, as a result of Ebasco's defective estimates of maximum costs, EEI had to incur excess financing costs of approximately $5 million. EEI's reasoning is that it was forced to borrow additional funds at an interest rate of 4½ percent, "which was the highest [rate] paid by any utility in a decade," whereas if more realistic estimates had been provided at an earlier date the entire funds required for the first 4 units might have been borrowed at the 3 percent interest rate obtained at the time of EEI's initial borrowing.

The second effect of Ebasco's performance was the 50 generator months' delay in constructing the units and getting them in commercial operation. A schedule showing the delay follows:

Unit	Date stated in contract	Date of commercial operation	Delay (in months)
1	Oct. 1, 1952	Aug. 1, 1953	10
2	Dec. 1, 1952	Sept. 1, 1953	9
3	Feb. 1, 1953	May 1, 1954	15
4	Apr. 1, 1953	Aug. 1, 1954	16
Total			50

One of the results of this delay was that AEC was forced to take a greater amount of costly "interim power" than it would have had to have taken if the Joppa plant had been completed on schedule. "Interim power" was power generated and delivered to AEC from sources other than the Joppa plant prior to commercial operation of the fourth unit. The cost of "interim power" prior to completion of the fourth unit averaged 7.8 mills per kilowatt-hour, whereas the cost of "permanent power" which was generated at Joppa and delivered to AEC, has cost less than 4 mills per kilowatt-hour. While we are unable to estimate precisely the amount of additional cost that was due to this factor, we believe that a conservative estimate is that AEC incurred over $8 million in extra power costs because of the construction delay.

The AEC–EEI power contract does not penalize EEI for failure to get the units in commercial operation on the dates stated in the contract. AEC, therefore, assumed the risks of any delay in construction and any delay in getting the units to work, at least to the extent of bearing the excess cost of obtaining its power from sources other than the Joppa units which were delayed.

Ebasco's Delay in Submitting Cost Information

One aspect of Ebasco's performance that was particularly onerous was that all of the cost information was not kept at Joppa; therefore, EEI and AEC did not have ready access to the complete cost picture in their efforts to control costs. This situation had the effect of delaying Ebasco's submission of cost information. Based on discussions with AEC officials, one reason for this apparently was the split in responsibility between the Ebasco Joppa staff and the Ebasco New York staff.

AEC's efforts to obtain current cost information were directed to its contractor, EEI. AEC has reported:

> Numerous discussions were held between AEC officials and EEI management concerning the manner of reporting the cost of the Joppa job. Of primary concern in all of these discussions was the time delay between the development of the cost information and its being made known to the Atomic Energy Commission.

We also noted delays of 4, 7, and 16 weeks between the date of preparation of some of the estimates and the date of their receipt by AEC. In fairness to Ebasco, it should be stated that we did not determine what portion of these delays, if any, was the fault of EEI.

A clear example of Ebasco's delay in submitting cost information involves the $19.9 million increase in its December 1952 estimate of $108.6 million which resulted in an estimate of $128.5 million in May 1953.

As indicated previously, Ebasco presented orally a $130 million estimate to the EEI board of directors on April 23, 1953.

The AEC Paducah office, however, was clearly uninformed of such a development, although it apparently suspected something was amiss. The following is from an interoffice memorandum from W. D. Miller, Chief of Operations Division, to the Paducah area manager:

> On May 12, 1953, I asked Mr. Turner White, Jr., of EEI, if they had a more recent cost estimate of the Joppa, Ill., plant than the last one of January 1953, * * *. I pointed out to him, as I had several times in the past several months, that Ebasco's reports of expenditure and commitments, together with current estimates of craft requirements, indicated that the estimate of $108,600,000 appeared to be several million dollars too low. Mr. White advised me that this figure was greatly in excess of several million too low, and was in fact $17 to $23 million too low or that the new estimate was now in the order of $125 to $130 million.

AEC has also reported:

> Based on the information in the April 29, 1953, weekly cost report and the estimated manpower requirements then in effect, it appeared that the construction-cost estimate would exceed $110 million; the $128,500,000 figure appeared unreasonably high. Mr. Miller visited Mr. K. W. Reese, engineering manager, Ebasco Services, Inc., on May 14, 1953, to obtain a reconciliation between the data given in the weekly construction-progress report and the May 12, 1953, intermediate cost report. Mr. Miller learned in New York that there would be a new manpower estimate extending the job 7 months longer than the estimate available dated January 15, 1953, which would add 6,087 man-months to the construction job.

As noted previously, Ebasco's informal explanation of the $19.9 million increase attributed much of the increase to the 15½-day work stoppage in January 1953. The record indicates that the January work stoppage would logically be the major reason for the labor portion of the $19.9 million increase, since there was only one minor work stoppage (4 days) between January 1953 and May 1953, the date of its

next estimate. It therefore appears that a substantial portion of the $19.9 million increase was apparent to Ebasco in February 1953, although AEC was not informed of the increase until May 1953. In addition, based on the cost information available to AEC at Joppa, it was unable to account for such a large increase and was required to visit the New York Ebasco office in order to obtain the necessary additional cost information.

Ebasco's Fee and Billings for Service

EEI entered into a contract on March 6, 1951, with Ebasco for engineering and construction services.

Among other things, the contract provided:

1. That Ebasco should receive, as compensation for services furnished, a fixed fee of $2,375,000, paid in monthly installments.
2. That the cost of services of the engineering staff should include, *in addition to salary compensation paid to such employees*, an amount for overhead expenses equal to 75 percent thereof. [Italic supplied.]
3. That the cost of services of the field office staff should include, *in addition to salary compensation paid to such employees*, overhead expenses in connection therewith. [Italic supplied.]
4. That, generally, all other costs incurred in connection with the Joppa project should be paid by EEI on a cost-reimbursement basis.

The contract also provided that Ebasco would furnish certain services at its own expense.

Both AEC and EEI have had audits made of Ebasco's billings to EEI under the contract.

During their initial audit at Ebasco's New York office, the AEC auditors tested the reasonableness of the 75-percent overhead rate applied to the salary compensation of the enginering staff employees. The AEC auditors ascertained that for the period from the commencement of the work through December 1952, the actual New York office overhead varied from 47 to 60 percent, or approximately $373,000 less than the amount billed by Ebasco for the period at the 75-percent rate.

On April 23, 1953, the day Ebasco reported its $130 million cost estimate to the EEI board of directors, the board employed the firm of independent public accountants that regularly audits EEI's financial statements to make an audit of the billings by the New York office of Ebasco to EEI. The independent public accountants audited the billings through December 31, 1953, and issued their report, dated March 26, 1954.

The independent public accountants' report shows that from inception through December 31, 1953, the Ebasco billings for engineering and construction services, exclusive of fee, totaled $4,725,305. Also, the amount billed by Ebasco to EEI for services exceeded the cost of such services to Ebasco by $362,725. It appears that this $362,725 is compensation to Ebasco in addition to the fixed fee provided in the contract. Finally, of the $4,725,305 billed by Ebasco, the auditors questioned the propriety of numerous items in a total amount of $471,499. The two largest items and a few of the smaller items that the auditors questioned are discussed below—the items discussed total $324,124.

1. Ebasco had a substantial portion of its drafting work performed by outside firms. Ebasco billed services of outside firms at salary costs, plus 75 percent for overhead. The auditors questioned whether the contract provision that provides an overhead factor of 75 percent on employee salaries (see contract provision above) should be construed to mean employees of outside drafting firms. The auditors believe such services are in a category of other costs that should be billed at cost under the contract. The amount questioned was $166,315.

2. The amounts which Ebasco billed EEI as salary compensation for engineering services represented the salary compensation actually paid the employees, plus a loading (5½ to 9 percent) for vacations and absence. Referring again to the contract (see above), it provides "* * * cost should include, in addition to salary compensation paid to such employees, an amount for overhead expense equal to 75 percent thereof." The auditors point out that the contract provides that the 75 percent overhead should be added to "salary compensation paid" in determining cost; it does not provide that the amount of salary compensation paid shall first be upped by a loading for vacations and absence before applying the 75 percent overhead. The amount questioned was $129,782.

3. Ebasco billed EEI 75 percent overhead on all salary compensation paid for engineering services, including premium paid for overtime as well as straight time paid. While the contract does not distinguish overtime premium from straight time, it has been the auditors' experience that certain engineering firms customarily bill overhead only on straight time paid, excluding any overtime premium. As a further indication of the policy of other firms, the auditors point out that the invoices of some of Ebasco's outside drafting firms showed they billed Ebasco overhead and profit only on straight time paid for overhead. The amount questioned was $25,301.

4. Ebasco billed EEI for travel and living expenses of Ebasco officers. Various other travel and living expenses of Ebasco officers were not billed. The auditors were informed that the individual officers decide whether their expenses should be billed. The auditors point out that such reimbursement is not mentioned in the contract and that it has been their experience that certain engineering firms do not bill expenses of general officers. The amount questioned was $1,626.

5. The billings to EEI included prorated amounts of expenses of the labor relations manager at various labor meetings, based on the manager's judgment of the benefit of each client from the meeting. One such amount billed EEI was $500 for a portion of the expenses of a labor convention in Miami, Fla.

6. In 1951 Ebasco paid legal fees pertaining to services rendered associated clients. The auditors questioned whether such cost should be included in a nonassociated client overhead like EEI, particularly since the expenditure applied to the period 1944–47. The amount prorated and billed to EEI was $600.

Soon after the independent public accountants issued their March report, on May 20, 1954, a conference was held between AEC and EEI

officials at Oak Ridge. AEC reports of the meeting contain the following information:

1. The amount of Ebasco's fee and the amounts of Ebasco's billings were in dispute.
2. EEI had offered Ebasco a compromise settlement with the understanding that unless Ebasco offered EEI an acceptable counterproposal in about 1 month, EEI would be forced to litigate the entire matter.
3. If a compromise was arrived at it would be set out in a clear-cut manner which could be easily explainable to AEC or any regulatory authority or public body.

Since the date of the above meeting EEI and Ebasco have had protracted negotiations for a compromise settlement. By letter dated February 18, 1955, EEI submitted the elements of a proposed compromise settlement to AEC. AEC has advised us that the proposed settlement provides essentially that Ebasco would not be allowed a profit on its construction work but would be allowed a profit on its engineering work. By letter dated March 10, 1955, AEC advised EEI in effect that such a settlement would not be satisfactory. The letter states, in part:

> This will advise you that the Atomic Energy Commission has given consideration to the matter of the proposed settlement of the claim of Electric Energy, Inc., against Ebasco Services, Inc., arising out of failures and deficiencies on the part of Ebasco Services, Inc., in the performance of its contract for engineering and construction services for your Joppa plant.
>
> The Commission has determined that the minimum negotiated settlement that can be accepted by the Commission without court action is one under which Ebasco Services, Inc., would receive no profit for its services on the Joppa project. * * * It is intended, however, that the amount of any settlement on this basis be the actual profit realized by Ebasco, as determined by audit.

AEC has advised us that EEI's independent public accountants are currently making an audit of Ebasco's charges to EEI for services rendered since December 31, 1953.

Current Status of Ebasco on AEC Projects

Ebasco is doing work for both of the private utilities groups that currently are supplying AEC electric power—EEI and OVEC (Ohio Valley Electric Corp.). We also understand that Ebasco is being considered by MVGC for design engineering and construction management work. The current status of Ebasco on AEC projects is briefly noted below.

As indicated previously Ebasco's construction services for EEI were terminated July 1953, but its design engineering services for units 5 and 6 were continued. As of January 1955, the design for units 5 and 6 was 97 percent complete. Ebasco's work, therefore, for EEI is essentially completed.

The OVEC board of directors appointed Ebasco to act as independent engineer under its mortgage to the Chase National Bank. As independent engineer Ebasco certifies that certain conditions provided in the mortgage agreement are satisfied prior to the trustee advancing funds as requested by OVEC. OVEC's original cost estimate for its two plants was $339 million. Ebasco's periodic cost estimates as independent engineer provide for "the estimated maximum effect of inflationary and escalationary trends" and have con-

sistently been in the amount of $406 million. In addition to the cost of the plants OVEC estimated that its organization costs and working capital requirements were $17 million.

OVEC completed its arrangements for financing in July 1953, after entering into agreements which provided $440 million from the following sources:

Stock	$20,000,000
Bonds	360,000,000
Notes	60,000,000
Total	440,000,000

The agreements with both the bond and note purchasers provide for OVEC to pay a ½ percent per annum commitment fee on the outstanding unused portion of the commitments.

In December 1954, OVEC decided that it was virtually assured that the overall cost of the facilities under construction plus the required working capital would not exceed $398 million. OVEC has therefore arranged for a reduction of $42 million in its purchase commitments to be made effective February 1955. The immediate effect of this reduction in the commitment contracts will be savings of ½ percent per annum of fees payable heretofore on the $42 million, or a savings of $210,000 per year for the remaining period of the commitment.

Ebasco's work for OVEC is still in progress.

With respect to the possibility of MVGC (known as the Dixon-Yates group) employing Ebasco, we were advised by the Deputy General Manager of AEC, letter dated February 21, 1955, as follows:

> In response to our recent discussions concerning the possible use of Ebasco for management services on construction of the MVGC plant, we have been advised by the president of MVGC that if Ebasco is recommended for architect-engineering and for the management of construction, Ebasco will be used for designing the plant and as the company's agent to manage construction, coordinate and supervise the work as a whole, but subletting work to all contractors under competitive conditions. Ebasco will do no construction and will have no interest in construction except in a managerial capacity as agent for the company. Equipment will be purchased under competitive conditions. Ebasco will employ no labor force and personnel at this project and their employees other than office, clerical, and accounting personnel will be limited to some 60–75 employees at supervisory or inspector level.

The AEC letter also advised us that MVGC has not yet submitted its recommendations to AEC for architect-engineer, general contractor for construction, or management services on construction as required by the contract. At the time MVGC submits its recommendations, it will outline how the engineering and construction will be organized and executed.

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November 27, 1956

Secretary, Joint Committee on Atomic Energy
Room P-88
Capitol Building
Washington 25, D.C.

Gentlemen:

We are recently in receipt of parts 2 and 3 of the Joint Committee on Atomic Energy REPORT OF THE COMPTROLLER GENERAL OF THE UNITED STATES ON ATOMIC ENERGY COMMISSION CONTRACTS FOR ELECTRIC POWER. Our request of November 6, 1956 requested part 1 of this title, parts 2 and 3 already having reached this Library. Would you kindly supply to us, accordingly, the lacking part, number 1, which will complete our files of this title.

Thanking you, we remain,

Yours sincerely,

John L. Hafenrichter
Serials and Documents Section

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